Space Weather Forecast

Issued on Tuesday, 11 June 2024 at 00:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class flares (R1-R2 radio blackouts) initially likely, slight chance of Strong flares (R3 blackout), risk declining through the period. Chance of minor solar radiation storm (S1-S2) initially, risk declining through the period.
Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is High with a Strong flare peaking at 10/1108 UTC, from the larger and more complex region on the southwest limb. This is the most active region, which has now rotated off the southwest limb and is no longer clearly visible. It will continue to contribute to the flare risk for another 24 hours or so until it is well away from the southwest limb. A further region in the southeast is now the largest region on the disc. It consists of a large leader spot with smaller spots around it. The remaining regions are mostly simple and stable at the present time. Some looping observed in SDO imagery suggests a new region to rotate onto the southeast limb in the next 24 hours.

A Coronal Mass Ejection (CME) which left the Sun on 08 June arrived at L1 10/1635 UTC, much later than anticipated, with an arrival observed at STEREO-A (ahead of Earth's orbit) at 10/0300 UTC, therefore it appears Earth may have observed the tail end of the CME as it passed. No new Earth-bound CMEs were observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds were at background levels initially, before the arrival of the aforementioned CME (which left the Sun on 08 June), with speeds reaching slightly elevated to elevated levels, near 500km. The IMF (Interplanetary Magnetic Field) was weak initially, but increased to reach Moderate or Strong levels with the arrival of the CME, with the all-important north-south component, Bz, initially neutral, but became moderately negative (southward) for a time. Geomagnetic activity was Quiet (Kp 1-2) initially, increased to Unsettled to Active (Kp 3-4) from 10/1500-2100 UTC due to CME influence.

Energetic Particles / Solar Radiation: Solar radiation levels have eased back below the S1/Minor radiation storm level.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate-flares are initially considered to be likely with a slight chance of further Strong flares, mainly from the region which has just rotated off the southwest limb. The risk reduces through Day 1 (11 June) as this region continues to rotate away from the southwest limb.

Solar Wind / Geomagnetic Activity: The CME (which left the Sun on 08 June) arrived at the STEREO-A spacecraft at 10/0300 UTC, with most likely the tail end of the CME arriving at Earth later than anticipated at 10/1635 UTC. Solar winds have recently increased to slightly elevated levels due to the CME influence, although should gradually decline to background levels during day 1 (11 Jun). A further slight enhancement is possible from the small coronal hole in south-centre disc later on Day 3 or early Day 4 (13-14 June).

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Geomagnetic activity is likely to be Unsettled or Active at first, due to the influence of the CME, which arrived late on 10 Jun, with a slight chance of G1/minor storm early Day 1 (11 Jun) if any prolonged negative, Bz, is observed. Mostly quiet conditions are likely on Day 2 (12 Jun), with a slight chance of Unsettled to Active intervals later on Day 3 and Day 4 (13-14 Jun) due to any weak coronal hole fast wind.

Energetic Particles / Solar Radiation: Solar radiation is now below S1/Minor radiation storm levels after the recent S3/Strong enhancement. A reducing risk of further S1 or S2 radiation storms as the complex sunspot continues to rotate away from the southwest limb in the next 24 hours.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	30	20	10
Very Active	R3 to R5 X	Yes	15	5	1	1

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	50	20	5	1
Very Active	**≥ S3 ***	No	10	5	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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